

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

## D. Remarks

Claim rejections:

Claim 1 has been amended to address this rejection. The term "electrical connection" has  
5 been changed to "connection".

Rejection of Claims 1-2 and 25 Under 35 U.S.C. §103(a), based on Liaw (USP 5,807,779) in  
view of Applicant's Background Art (Background Art).

Claim 1 has been amended to include the limitations of claim 25.

10 The semiconductor device structure on a silicon substrate of amended claim 1 includes a  
contact, a gate electrode, an insulating film, and a silicon nitride film for preventing carbon  
diffusion. The contact penetrates an interlayer insulating film and is in physical contact with a  
diffusion layer in the silicon substrate. The gate electrode is formed on the silicon substrate and  
contains a nitride film at upper and side portions. The insulating film is formed from a gas  
15 containing carbon. The silicon nitride film for preventing carbon diffusion has a portion  
sandwiched between the interlayer insulating film and the silicon substrate and adjacent to the  
gate electrode in a direction essentially parallel to a substrate surface, such a sandwiched portion  
having a thickness in a direction perpendicular to the substrate surface that is less than a  
thickness of the gate electrode in the perpendicular direction, the silicon nitride film traversing a  
20 region except a portion for providing the connection between the contact and the diffusion layer,  
and is formed on the nitride film at the upper and side portions of the gate electrode wherein the  
silicon nitride film for preventing carbon diffusion includes a portion having a bottom surface in  
contact with and extending parallel to the diffusion layer away from the gate electrode and a top  
surface in contact with the interlayer insulating film.

25 As is well established, a prima facie case of obviousness requires a rejection to meet three  
basic criteria. First, there must be some suggestion or motivation to modify a reference or  
combine reference teachings. Second, there must be a reasonable expectation of success.  
Finally, the prior art reference(s) must teach or suggest all claim limitations.<sup>1</sup>

Liaw does not teach or suggest the silicon nitride film for preventing carbon diffusion  
30 including a portion having a bottom surface in contact with the diffusion layer as required in  
amended claim 1.

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

*Liaw* discloses a tungsten layer 15 (alleged to correspond to Applicant's contact of claim 1) connected to a doped source/drain region (argued to correspond to Applicant's diffusion layer). *Liaw* also discloses a silicon nitride layer 9 (alleged to correspond to applicant's silicon nitride film for preventing carbon diffusion). However, in *Liaw* the silicon nitride layer does not have a bottom portion "in contact with the diffusion layer" (i.e. the diffusion layer that is in physical contact with the tungsten layer 15), as recited in amended claim 1.

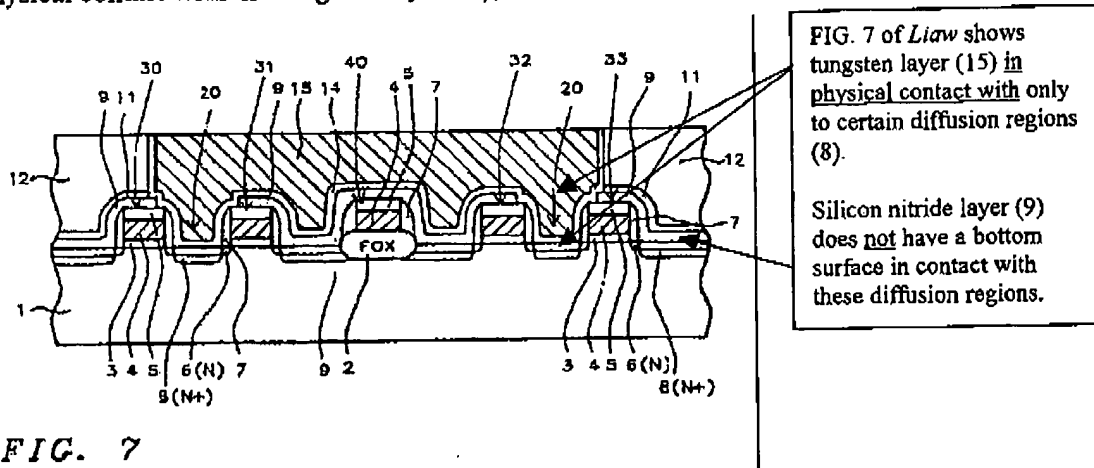


FIG. 7

The other reference relied upon does not show such a limitation, either.

Applicant's *Background Art* shows conventional silicon nitride side walls (24 or 40) formed on the side of a word line and bit line. However, such side walls do not have a portion parallel to a diffusion region, as recited in amended claim 1.<sup>2</sup>

Accordingly, because the combination of references does not show or suggest all the limitations of Applicant's amended claim 1, a prima face case of obviousness is not believed to exist, and this ground for rejection is traversed.

<sup>1</sup> MPEP §2143.

<sup>2</sup> See Applicant's Specification, FIG. 16 and 17. Side wall 24 (of FIG. 16) and side wall 40 (of FIG. 17) only have vertical portions.


**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Claim 1 has been amended.

The present claims 1 and 2 are believed to be in allowable form. It is respectfully requested that the application be forwarded for allowance and issue.

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Respectfully Submitted,

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